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ABSTRACT

Providing a variety of instructional methods and materials, developing unique and effective communication systems, and evaluating the process are keys to the delivery and effectiveness of the field-based programs in graduate education offered by Nova Southeastern University (Florida). This 4-year nonprofit institution is a leader in distance education, offering off-campus undergraduate and graduate degree programs in education, business and public administration, psychology, and computer science. Almost half of the 12,000 students are in field-based programs delivered in a variety of ways ranging from regional locations with once-a-month classes to working at home with a personal computer and modem. The cluster format of monthly meetings has been the most popular form of distance education, but the telecommunications approach is becoming the most successful alternative delivery approach. In distance education, the use of multimedia is especially important. Online tools and resources used by Nova Southeastern include: (1) audiobridges (toll-free telephone connections for two-way discussion); (2) videotapes; (3) audiotapes; (4) telephones; (5) electronic mail; (6) the electronic classroom (virtual classroom through split-screen technology); and (7) the electronic library (catalog and delivery services). The effectiveness of these approaches is the subject of continual evaluation used in planning for new technologies and more cost-effective use of existing technologies. (Contains 5 references.) (SLD)

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"Graduate Education Through Telecommunications: The Computer and You"

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"Graduate Education Through Telecommunications: The Computer and You"

INTRODUCTION:

> The next generation of educational programs -- called *online education* or *computer-based distance learning* -- is anything but dull and hackneyed. This is education on the brink -- technology tapped and harnessed to bring learning to people too busy to attend traditional school or who don't have access to conventional campus environments.
>
> (Roberts, 1991, p.19)

A definition of distance learning that is currently being considered by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) reads as follows:

> *Distance learning is that educational process that occurs by delivering instruction designed to accommodate students who are physically remote from the main campus or from a location of campus or program origin. In this process, the requirements for a course or program may be completed through face-to-face interactions and/or through remote communications with instructional and support staff including either one-way or two-way written, electronic, or other media forms.*

A growing number of universities throughout the United States and Canada now offer computer-assisted distance education graduate programs. Distance education is defined as instruction that occurs at a distance from the instructor (Feasley, 1982); or the delivery of instruction in which student learning takes place at one location, while content and management expertise are at another location (Evans, 1986). In many cases, distance education incorporates the use of technology to facilitate communication between students and faculty. One form of distance education that is becoming more popular today is the use of a computer and modem to electronically deliver instruction and to provide real-time interaction between the faculty member and a group of students.

Communication is also an important factor in distance education. In addition to a variety of instructional delivery methods, unique means must be developed and used to enable students to communicate with each other and with the professor. This is especially important, since students and faculty are not in direct proximity with one another. The effectiveness of such a delivery and communication system is also

important. Providing that variety of instructional methods and materials, developing unique and effective communication systems, and continually evaluating the process is the key to the continued delivery and effectiveness of the field-based programs in graduate education offered by Nova Southeastern University (NSU).

THE UNIVERSITY:

Nova Southeastern University, a four-year non-profit, fully accredited, co-educational institution, is located in Fort Lauderdale, Florida. Founded in 1964, NSU is an acknowledged leader in distance education programs, offering off-campus undergraduate and graduate degree programs in education, business and public administration, psychology, and computer sciences. Non-traditional graduate programs have been a hallmark of Nova Southeastern University for the past 23 years.

Nova Southeastern University's main campus is located on a 200-acre site in Fort Lauderdale, Florida. Nova's "national campus" extends throughout Florida at 76 sites in 28 cities, to 72 sites in 22 other states, and to four international locations. The Nova plan stresses the critical relationship between theory and practice; it reinforces and tests the classroom experience through applied research and community service as integral parts of the academic experience. Consistent with its mission, Nova Southeastern University extends its resources to provide educational opportunities to working professionals nationwide, with faculty teaching at corporate and other locations across the country. Nova also delivers programs through a variety of educational technologies, including telecommunications. The University is committed to the idea that education should not be timebound or placebound and uses a variety of educational technologies.

Nova Southeastern University has been accredited by the Commission on Colleges of the *Southern Association of Colleges and Schools (SACS)* since 1971 and received its current ten-year reaffirmation of accreditation by SACS in 1985. In both instances, accreditation fully encompassed Nova's distance education programs. It is accredited to award bachelor's, master's, educational specialist, and doctoral degrees. Nova Southeastern University meets regulations that govern the provision of distance education programs by non-resident students in 30 states. The University is alma mater to more than 30,000 graduates of various programs who live in all the 50 states. Included among its alumni are 27 college presidents and chancellors, 114 college vice-presidents and deans, a state commissioner of education, nine superintendents of the nation's 47 largest school districts, four State of Florida Teachers of the Year, the chairperson of the Florida Education Standards Commission, judges, attorneys, a state legislator, corporate executives, entrepreneurs, and other leaders and officers within public and private organizations. On January 1, 1994 Nova University and Southeastern Medical School merged to become Nova Southeastern University.

Almost one-half of Nova's 12,000 students are in field-based programs. These programs are delivered in a variety of ways ranging from regional locations where students meet once-a-month for an all-day Saturday class with a professor flown to the particular location by Nova, to the student working at home using a personal computer and modem to communicate electronically over regular phone lines.

These programs began in 1972 as "Cluster-Based" programs located in convenient sites around the country. Students from the region come together one weekend each month to meet with their Nova professor who flies in to conduct the class. This cluster format is still our most popular form of distance education. However, other programs began experimenting with alternative delivery systems involving the mail, telephone, video, etc. The most successful of these has been the telecommunications approach.

There are various brochures available on Nova Southeastern University that describe the many different field-based graduate programs, including some that are delivered primarily through telecommunications. Although each institution has its own unique definition of telecommunications, it is generally defined at Nova Southeastern University as the use of a computer, modem, and regular phone line to deliver instruction from the main campus to the homes of individual students. However, we usually supplement this basic delivery strategy with other forms of mediated instruction. For example, some programs supply their students with introductory videotapes; others use telephone conference calls through an audiobridge to connect remote students and their faculty for group discussions; still others use speaker phones to connect remote groups. Detailed, printed study guides are of special value in all programs so students have written instructions, lists of objectives, requirements, background information and articles, etc. We are now initiating projects to explore the use of PC-based, two-way compressed video as a main delivery system of the future.

The use of video and audio cassettes to enhance and help prepare for online discussions is becoming more important each year. The University uses the Unix Operating system (Digital's Ultrix) on its host computer (named "Novavax") and provides a number of programs to assist the learner with online work. Computer conferencing, the Electronic Classroom, the Electronic Library, the Internet, CAI systems, Writers' Workbench, SPSS-X and many other programs are among those available to students online. In addition to electronic mail (email), Nova developed a unique interactive program called the Electronic Classroom (ECR). In the Abraham S. Fischler Center for the Advancement of Education, the following programs have made relatively heavy use of technology in their delivery of instruction:

- Programs for Higher Education - the Multi-Tech approach and the
- Masters of Child Care Administration - Multiple Media

- The GEM Program - Facilitated Instruction
- Child and Youth Studies Programs - National Cluster

In 1983, we began our initial work in the use of telecommunications for the delivery of instruction in two doctoral programs: the doctor of arts degrees in information sciences (DAIS) and the doctor of education in computer education (CED) for professionals who could not take time off from their full-time positions in these areas to continue their education. We soon added additional doctoral majors and introduced a masters and educational specialist degree delivered through telecommunications. In these online programs, students meet with their colleagues and faculty in "live" meetings either twice-a-year (one week in the summer and one week in the winter) in Ft. Lauderdale or in quarterly, weekend cluster meetings in regional locations plus one week on campus in the summer. A few of the Nova programs, like the doctorate in higher education and the doctorate in business combine the Saturday Cluster format and the Online electronic approach and require the students to take part of their program online and the rest in the cluster format.

The masters programs in education ("GEM") offer graduate modules of instruction for students in Florida, Arizona, and Nevada. A number of these students complete part of their program through audiobridging (like a telephone conference call) from home so they can talk with their instructor and classmates. At other times, they meet at a regional GEM site and use a speakerphone to interact with a live class being offered on campus at the same time. We are looking into the use of compressed video to replace part of the time currently spent in audioconferencing and audiobridging.

Using what we learned in these initial activities, the Fischler Education Center adopted the online approaches to the Saturday cluster-format in the masters and doctoral programs. A few years ago, our Child and Youth Studies (CYS) programs adapted some of the techniques being used in the Center for Computers and Information Sciences (CCIS) and began offering students an optional online delivery approach, known as the National Cluster (although it is actually international in scope now). New clusters start each year; the sixth cluster began recently.

Our CYS doctoral program is offering a new specialization in the "Applications of Technology to Education and Training" (APTEC) for those with an interest in technology as a subject as well as a delivery system. A unique aspect of the CYS program is that we developed a longitudinal study to compare effectiveness and satisfaction between students enrolled in two of the national clusters with students in two of the regular weekend clusters.

The CYS program utilizes both the cluster delivery system and the National Cluster format, which uses a combination of the cluster approach as well as

electronically delivered interaction. Students in this format meet twice a year for a 3 to 5-day period to interact with the professor responsible for a specific study area. During the following 3-4 months, students and faculty interact through the use of the audiobridge, video and audiotapes, electronic mail, and the Electronic Classroom (ECR).

An example of the courses in a typical CYS doctoral program are listed below. These are the core study areas and the six specialization courses taken by students in the Application of Technology to Education and Training (APTEC) specialization:

Year 1

EDUT 8001: Integrating Educational Technology in Curriculum Design and Evaluation (3 credits)
EDUT 8001: Application of Technology to Education, Training and Instructional Management (2 credits)
CED 8486: Implementing Emerging Technologies in Programs for Children and Youth I (2 credits)

Year 2

EDUT 8003: Managing Educational Technology Programs (3 credits)
EDUT 8004: Human Resources: Issues and Research in Educational Technology (2 credits)
CED 8487: Implementing Technologies in Programs for Children and Youth II (2 credits)

MULTIMEDIA APPROACH

A variety of approaches and/or strategies are important in the provision of appropriate education to a society that is increasingly multi-cultural. In distance education, the use of multimedia is especially important. The traditional methods of chalk/talk, listen/learn need to yield to teaching strategies which address the whole student, their abilities to learn visually and tactically as well as mentally processing information, and more importantly, to challenge the student not just to absorb information provided, but to use their powers of higher order thinking to inquire, research and problem solve in the search for solutions and answers of their own. Technology can have an important impact here, through the use of simulation programs, access to a broad variety of databases that can provide textual and visual information, and securing information and informed opinions of others through the conferencing capabilities of telecommunications. It is therefore most appropriate that

those who are involved with education, training and instructional management through the use of technology be thoroughly immersed in the application potentials of today's available software and hardware.

Delivering graduate education at a distance from the home campus is more than simply getting information from the university to the student. It involves providing students with stimulus materials and information in a variety of formats, obtaining reactions students in a variety of ways, and providing instructor's feedback to students through a variety of sources. Variety is the key to enriching the distance delivery system.

ONLINE TOOLS AND RESOURCES:

Various forms of technology are used at NSU to bring distance instruction and learning opportunities to the students. These include the use of an audiobridge, videotapes, audiotapes, the telephone, email, the electronic library, electronic classrooms (ecr), and the Writers Workbench (wwb). Each is briefly described below:

- **Audiobridge**
  A technique to enable students to call a central, toll-free number from their home telephones and to be connected together with their instructor and classmates for a two-way discussion period on a pre-specified topic. The institution receives a bill for all of the long distance connections and for use of the audiobridge technology.

- **Videotapes**
  Traditional half-inch VHS videotapes are prepared in the Nova TV Studio and duplicated for loan to the students. These are viewed in the home and then discussed online, in the audiobridge, or at the various "live" class sessions. As new tapes are made, a greater degree of student involvement is built-in as students are directed to stop the tape every 15 minutes or so and to complete various activities.

- **Audiotapes**
  Although not used extensively, some commercial audiotapes and some tapes of Nova sessions have been duplicated and shared with the students for their home listening. Since this is such an economical medium and students like to have tapes for review in their car tape players, greater use may be made of this medium in the future.

- **The Telephone**
  Although rather traditional and low tech, the telephone enables faculty and students to enjoy one-to-one contact for specific discussions or clarification. Students can call-in on a toll-free number when they have questions or need extra help.

- **Electronic Mail** (email)
  All students in the National Cluster must have access to a personal computer and modem to participate in this electronic approach. As might be expected, much of the two-way interaction between students and faculty (and between students) occurs through the use of email. Email has a major advantage over the telephone because you do not have to play phone tag when you use email. You leave a message and the other person gets it whenever they find it convenient to logon.
  The instructor can reply with a stroke of a key, so rapid response is virtually assured. The instructor can set-up an alias (group of addresses) and mail a message to an entire class as easily as writing one student. The amount of communication is generally enhanced through the use of email.

- **The Electronic Classroom** (ecr)
  One of the greatest features of Nova's online delivery system is the ability to simulate an actual class setting while the students participate from their individual homes located almost anywhere in the world. In 1985 Nova staff created a virtual classroom that they named the "Electronic Classroom." Utilizing the Unix system, it provides an electronic forum in which teacher and students interact simultaneously. Two-thirds of the screen is allotted to the teacher to display previously prepared material, or to enter questions and comments in real time. One-third of the screen displays the names of students who have logged into the class. The use of that portion of the screen is given to a student when "called on" by the teacher using the computer screen as their "virtual classroom." The latter is a program developed by Nova that utilizes the unix system, to emulate a traditional classroom online. Up to 58 students can meet at a prearranged time in one of the 32 or more online classrooms. Students may ask questions, make comments, etc. that may be seen by all of the participants in the "classroom" setting.

  Students enter the room, take a seat, observe the information provided by the professor, raise their hands to ask or answer questions, get called upon, receive comments back from the professor and classmates on their contributions, can be tested, etc. One professor even breaks the class into three smaller groups and sends them off to other electronic classrooms for small group discussions. Then when the total group gathers back together

in the main classroom, the leader of each group gives a summary of their discussions.

- **The Electronic Library**
  One of the important increasingly resources for Nova's online students is the Electronic Library (EL). The university library catalog can be accessed online and requests made for books and articles to be sent to the students. An information specialist conducts electronic literature searches on topics of special interest and need. The Electronic Library menu also connects the student to supplementary services to enable each student to complete individual, online searches of the ERIC database, order books and articles, and access online library catalogs around the world.

EFFECTIVENESS OF ELECTRONIC DELIVERY FOR THE CYS PROGRAM:

While the use of electronic media has received acceptance from much of the educational community, there is to date insufficient data to prove or disprove the educational value of these media. In a study reported by MacFarland (1990) concerning the efficacy of ECR, subjects viewed the medium as being "superior to traditional instruction in view of access and equivalent to traditional instruction in view of learning behaviors and outcomes" (p. 13).

PROJECTIONS FOR FUTURE DIRECTIONS:

Although currently the use of computers, audio and videotapes, and the mailing of computer disks seem to be most appropriate for the delivery of distance instruction into the home today, we anticipate changes in the near future. The potential of multimedia resources for those who can accept the challenge of constantly changing technologies, holds great promise for those who can learn, as Gayeski (1992), puts it: "to live on the 'leading, bleeding' edge." (p. 12). As a result, we see an increased emphasis on the use of these media:

- **CAI Packages**
  In the immediate future, CAI programs will be provided on disk in an MS-DOS format and later in the MAC format. Eventually, similar lessons will be provided online for easier access and revision. These will be used to increase the amount of instructionaL time provided to students; some programs will be provided for enrichment activities. We are currently beginning this project in the area of Research and Evaluation where students indicate they need the most support.

- **Videotapes**

The use of videotapes will be further expanded so tapes are available in all curricular areas. The approach used in these tapes will be increasingly interactive so students must perform various activities during the viewing of the tapes and as follow-up activities. Online conferences may be planned to follow-up the viewing of selected tapes.

- **Audiobridge**
  Although very expensive, audiobridges are currently being used in the Human Development course. Its use will be expanded to the Research and Evaluation area but it will probably be used for shorter periods of time by combining it with the use of the less expensive, computerized, electronic classroom sessions.

- **CD-ROM**
  We will become more involved in the production of CD-ROM discs or their successor so that students can enjoy full multimedia CAI in their homes as part of their degree work.

- **Two-Way Compressed Video**
  As emerging technologies become more affordable, we will incorporate their use into the program. As costs become lower, direct home access will be even more feasible than it is today. The development of affordable multimedia personal computers (MPCs) that include support for CD-ROM, digitized audio and high-resolution graphics, connected by optical fiber for full two-way video and audio connections is not far in the future. When available at a reasonable cost to the public, MPCs will provide an even greater opportunity for interactive educational programs to supplement the data exchanges we enjoy today.

The computer-based, distance education component of the Child and Youth Studies programs is still in its infancy. Relatively small numbers of students and faculty have participated in the program to date. However, the impact made on these students has already been significant and the approach being used has become the starting point for other programs as they begin to move into the use of high tech delivery techniques. Bugs still need to be worked out of the delivery and training system. The research upon which we have embarked should begin to provide important answers for us in the near future.

Certain advantages have already been noted. In one instance, a student on the west coast sent work to his advisor on the east coast by email and received the advisor's review within 24 hours. The student then made the necessary corrections and two days later sent the revised work to the advisor. The advisor was now attending a conference, but had brought along a laptop with a modem — the student

received approval the following day. Normal time for this process using regular mail would have been increased by at least an additional 10 to 12 days.

It seems that National Cluster members tend to communicate with faculty and each other more frequently than students in the traditional site-based clusters. Certainly, ease of communication is one factor. We must also consider that, because the program is new, we may be experiencing a Hawthorne effect that will disappear with time.

Nova Southeastern University recognizes the urgent need to provide better access to education for adult learners, especially as the gap between the necessary job skills and the education of the adult population increases. The increased mobility of our society adds another dimension to that problem.

It is vital that we keep abreast of delivery modes that can provide quality education that will also be cost-effective for student and university alike. It is also important to recognize that there is no *super medium*. Best strategies recommend that a wide range of media incorporated in a planned and integrated manner will provide the optimum variety of educational approaches (Moore, 1987). Spikes (1990) is convinced that the "training organization of the future, the classroom of the future, the education of our citizens of the future will be technologically driven" (p. 14). Distance learning through the use of appropriate technology is a growing field. The future is wide open, and Nova Southeastern University is proving that it plans to continue to be one of the forerunners.

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